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Review Article

ANTICANCER ACTIVITY OF *VISHAGHNA MAHAKASHAY*

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ABSTRACT

Fifty categories of *Mahakashayas* have been outlined, along with five hundred specific examples, to illustrate their therapeutic applications, acknowledging the infinite scope of medicinal formulations. The concise presentation aims to provide a foundational understanding for practitioners with limited cognitive capacity while serving as a reference framework for advanced practitioners to foster further intellectual exploration and innovation in treatment methodologies. This article is being developed from an innovation perspective and aims to explore how contemporary research methodologies can be applied to investigate the anticancer properties of drugs categorised under *Vishaghna Mahakashaya* which are *Haridra (Curcuma longa), Manjishtha (Rubia cordifolia), Suvahaa (Operculina turpethum), Sukshama Ela (Elettaria cardamomum), Paalindee (Hemidesmüs indicus), Chandan (Santalum album), Kataka (Strychnos potatorum), Shirish (Albizia lebbeck), Sinduvaara (Vitex negundo)* and *Shleshmaataka (Cordia dichotoma)* contributing to cancer care and prevention. Ayurvedic interventions are not proposed as replacements for conventional allopathic cancer treatments but rather as complementary approaches to support prevention, enhance resilience, and restore immune function.

INTRODUCTION

Acharya Charaka, in the *"Shadvirechan Shatashritiya Adhyaya,"* has described fifty major decoctions based on their efficacy. Each decoction formulation consists of ten specific drugs. Depending on the pathogenesis of a disease, the decoction can be prepared using one, two, or three drugs at a time. Although numerous drugs possess similar therapeutic effects, this chapter focuses on a selection of ten specific drugs within each decoction formulation.

Agad Tantra, a branch of Ayurveda, specializes in the management of poisoning and the therapeutic applications of toxins. In Ayurveda, toxins are known as "*Visha*" and possess ten distinct properties: *Laghu* (light), *Ruksha* (dry), *Aashu* (quick-acting), *Vishad* (non-slimy), *Vyavayi* (pervasive), *Tikshna* (sharp), *Vikaasi* (spreading), *Sookshma* (subtle), *Ushna* (hot), and *Anirdeshyarasa* (indescribable taste).[2] These properties can be counteracted using *Vishaghana Mahakashaya*, a group of antidotal herbs.

Ayurveda literature described various *Agad Yogas*, each with distinct properties and therapeutic applications for treating toxicity. These formulations help neutralise toxins and restore systemic balance. *Agad*, acting as an antidote for poisoning, consists of a combination of antitoxic medicines along with substances that provide anticancer, antioxidant, anti-inflammatory, antihistaminic, blood purifier, hepatoprotective, and immunomodulatory benefits.

Cancer is a broad group of diseases marked by the uncontrolled growth and spread of abnormal cells, which can invade and damage healthy tissues. According to the WHO, about one-third of cancer-related deaths are linked to factors such as tobacco use, obesity, alcohol consumption, poor diet (low intake of fruits and vegetables), lack of physical activity, and exposure to harmful chemicals.

Combining Ayurvedic therapies with conventional cancer treatments requires a team-based approach, where Ayurvedic experts and oncologists work together to provide the best care for patients.

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This review highlights the need for scientific research and patient safety while exploring Ayurvedic treatments for cancer. At the same time, it respects Ayurveda's deep-rooted traditions and holistic healing principles. This article aims to summarise various studies conducted on anticancer properties of drugs included in *Vishaghana mahakashaya*.

AIMS AND OBJECTIVES

The aim is to study the anticancer properties of each drug in the *Vishaghna Mahakashaya*.

MATERIAL AND METHODS

Ayurvedic and modern texts, research articles, review papers, online internet resources, and other relevant references related to the drugs of *Vishaghna Mahakashaya*.

Drugs	Latin Name	*Rasa*	*Veerya*	*Vipaka*	*Guna*	*Doshghnta*
Haridra (turmeric)	*Curcuma Longa* Linn.	*Tikta, Katu*	*Ushna*	*Katu*	*Ruksha, Laghu*	KP
Manjishtha (Indian Madder)	*Rubia Cordifolia* Linn.	*Madhur, Tikta, Katu*	*Ushna*	*Katu*	*Guru, Ruksha*	RKP
Suvaha (Rasna)	*Pluchea Lanceolata*	*Tikta*	*Ushna*	*Katu*	*Guru*	KP
ela (lesser Cardamom)	*Elettaria Cardamomum*	*Katu, Madhur*	*Sheeta*	*Madhur*	*Laghu, Snigdha, Sugandhi,*	VPK
Palindee (Trivrat)	*Operculina Turpethum* Linn.	*Katu, Tikta, Madhur, Kashaya*	*Ushna*	*Katu*	*Guru, Ruksha, Tikshna*	KP
Chandan	*Santalum Album* Linn.	*Tikta, Madhur*	*Sheeta*	*Katu*	*Laghu, Ruksha*	KP
Katak (Nirmali)	*Strychnos Potatorum*	*Madhur, Kashaya, Tikta*	*Sheeta*	*Madhur*	*Laghu, Vishada*	KV
Shirish	*Albizia Lebbeck*	*Madhur, Tikta, Kashaya*	*Ushna*	*Katu*	*Ruksha, Laghu, Tikshna*	VPK
Sindhuvar (Nirgundi)	*Vitex Nirgundo*	*Tikta*	*Ushna*	*Katu*	*Laghu, Ruksha*	KV
Shleshmatak	*Cordia Dichotoma*	*Madhur*	*Ushna*	*Katu*	*Snigdha, Guru, Pichchhila*	VP

V=Vata, P=Pitta, K=Kapha, R=Rakta

Haridra

Curcumin, the active compound in *Curcuma longa* extract, has demonstrated significant anticancer effects against various types of cancer, including prostate, breast, colorectal, pancreatic, and head and neck cancers, in both laboratory and animal studies. Additionally, in recent studies clinical trials involving cancer patients have confirmed its efficacy and safety, whether used alone or in combination with other anticancer treatments. Curcumin is thought to exert its anticancer effects through multiple mechanisms, influencing various cellular pathways and modulating the production of cytokines, enzymes, and growth factors such as MAPK, EGF, NFκB, PKD1, COX-2, STAT3, TNF-α, and IκKβ.

The use of curcumin in cancer treatment has been largely restricted due to its poor water solubility, which leads to low cellular absorption, limited oral bioavailability, and reduced chemical stability. To address these challenges, various strategies have been explored, including structural modifications and advanced drug delivery systems. Altering its chemical structure has resulted in curcumin derivatives with improved effectiveness, as well as enhanced solubility and stability.[3]

Manjishtha

A study conducted on the human carcinoma cell line HeLa assessed the anticancer properties of Rubia cordifolia, revealing that its ethanolic root extract effectively targeted the cancer cells. Another in vitro study demonstrated that the plant's methanol extract exhibited inhibitory effects against human cervical cancer and human larynx carcinoma cell lines. Additionally, RC-18, a purified extract of Rubia cordifolia, displayed strong anticancer activity against P388, L1210, L5178Y, and B16 melanoma cancer cell lines. Further in vitro research was carried out to examine its antitumor potential on human leukaemia and histiocytic lymphoma cell lines.[4]

Recent studies have highlighted the significant role of phenolic compounds in cancer treatment. Extensive research has demonstrated the antimutagenic, anti-carcinogenic, and antioxidant properties of *Manjishtha (Rubia cordifolia).*[5]

Suvaha (Rasna)

Pluchea lanceolata has been identified as a powerful chemopreventive agent, effectively suppressing Fe-NTA-induced renal carcinogenesis and oxidative damage.

Additionally, the immunosuppressive potential of a 50% ethanolic extract of *Pluchea lanceolata* and its bioactive chloroform fraction was evaluated using fundamental immunomodulation models. The results indicated that *Pluchea lanceolata* induces immune-suppression by inhibiting Th1 cytokines.[6]

Ela

Cardamom's antioxidant properties, along with its ability to inhibit NF-κB and suppress pro-inflammatory cytokines, are considered its primary mechanisms of action.

HPLC analysis of cardamom extract identified polyphenolic compounds, including tannic, gallic, caffeic, and 4,5-dicaffeoyl quinic acids. These phenolic compounds typically neutralise free radicals and contribute significantly to cancer prevention and treatment.[7]

This study emphasizes the potential of cardamom essential oil, particularly its key components, 1,8-cineole and α-terpinyl acetate, as a natural source of anticancer compounds.

The essential oil demonstrated notable cytotoxicity against MDA-MB-231 and HEK 293 cells, though its effectiveness against U87 glioblastoma cells was relatively limited.[8]

Palindee (Trivrat)

Operculina turpenthum extract exhibits cytotoxic effects on oral squamous cell carcinoma (OSCC). It induces cell cycle arrest by suppressing cyclin D1 and promotes apoptosis by increasing P53 expression. Additionally, it inhibits tumor growth by down regulating NF-κB and COX-2. These properties suggest that it has potential as a safe and effective chemopreventive or chemotherapeutic agent for oral cancer.[9]

The chloroform extract of the plant was found to contain alkaloids, triterpenoids, and flavonoids. It was observed that this extract exhibited higher anticancer activity against MCF-7 cell lines compared to the ethanol extract.[10]

Chandan

Studies on cell lines and animal models suggest that α-santalol and sandalwood oil hold significant potential for cancer prevention and treatment. These compounds can target multiple pathways involved in carcinogenesis while exhibiting minimal toxicity. Their anticancer properties are linked to various mechanisms, including proapoptotic, antiproliferative, antiangiogenic, antioxidant, and anti-inflammatory activities.

α-Santalol, in particular, shows great promise as a chemopreventive agent for skin cancer. Moreover, recent research has highlighted its effectiveness against non-skin cancers, such as breast cancer (MCF-7 and MDA-MB-231 cell lines) and prostate cancer (PC-3 and LNCaP cell lines). The primary anticancer mechanism observed involves inducing cell cycle arrest and triggering apoptosis in cancer cells.[11]

Katak (Nirmali)

The polysaccharide extracted from the seeds of *Strychnos potatorum* has demonstrated significant cytotoxic activity against the human breast cancer cell line MCF-7. Additionally, its antioxidant properties have been assessed, revealing strong free radical scavenging potential.[12]

Shirish

A recent study revealed that the saponin-rich fraction of *Albizia lebbeck* exhibits antiproliferative, antiangiogenic, and apoptotic potential in various in vitro models. Additionally, it was found to induce chromosomal aberrations, which may influence the cell cycle. The antiproliferative activity of this saponin-rich fraction was specifically evaluated against the MCF-7 Human breast carcinoma cell line.[13]

The ethanolic extract of *Albizia lebbeck* exhibits potent antitumor activity, as it effectively and significantly suppresses tumor growth both in vivo and in vitro. This effect is evident through reductions in tumor volume, weight, and viable cancer cell count.[14]

Sindhuvar (Nirgundi)

Vitexin from *V. negundo* seeds shows potential against hepatocellular carcinoma by inhibiting HepG2, Hep3B, and Huh-7 cell proliferation and growth, inducing G1/G0 cell cycle arrest.

Vitexicarpin, a flavone isolated from the chloroform-soluble extract of *V. negundo* leaves, exhibits anticancer activity against lung cancer.

Studies found that aqueous and ethanolic extracts of *Vitex negundo* L. induce apoptosis, inhibit growth, and exhibit anticancer effects in MCF-7 breast cancer cells.

The study demonstrated the antitumor efficacy of silver nanoparticles (AgNPs) biosynthesized from *V. negundo* L. leaf extracts against HCT15 colon cancer cells.[15]

The study investigated the cytotoxic effects of methanol extracts on the KB oral cancer cell line using an MTT assay. It focused on assessing the phytochemical composition, antioxidant activity, and cytotoxic properties of methanol extracts derived from

Vitex negundo, Lantana camara, Bauhinia variegata, and Bauhinia racemosa.[16]

Shleshmatak

The study evaluated the anticancer activity of various parts of C. dichotoma against human cancer cell lines and found that the bark may serve as a valuable natural source for anticancer drug development. The bark exhibits anticancer properties against the A-549 lung cancer cell line. The chloroform fraction of the bark showed significant anticancer potential, inducing cell death in A-549 cells through apoptosis, primarily driven by excessive ROS production. Given its promising efficacy, this fraction could be a crucial candidate for cancer chemoprevention or chemotherapy in lung carcinoma patients.[17]

DISCUSSION

The study of the anticancer properties of the ten herbs in *Vishaghna Mahakashaya* reveals that each possesses unique bioactive compounds with significant potential against various cancer types. These herbs exhibit mechanisms such as inducing apoptosis, inhibiting tumor growth, and modulating immune responses. Their traditional use in Ayurveda for detoxification and treating poison-related conditions aligns with modern findings on their anticancer effects.

CONCLUSION

This synergy between ancient knowledge and contemporary research underscores the importance of further studies to harness these herbs in integrative cancer therapies.

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